Course guide  
250680 - ENEMEDAMB - Energy and Environment

Unit in charge: Barcelona School of Civil Engineering  
Teaching unit: 713 - EQ - Department of Chemical Engineering.  
Degree: MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2014). (Compulsory subject).  
Academic year: 2022  
ECTS Credits: 5.0  
Languages: Spanish

LECTURER

Coordinating lecturer:  JORDI LLORCA PIQUE  
Others: JORDI LLORCA PIQUE

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
13340. Apply scientific concepts to environmental problems and their correlation with technological concepts.  
13347. Dimension unconventional systems and advanced treatment and raise their mass balance and energy.

TEACHING METHODOLOGY

The course consists of 3 hours per week of classes in which the teacher explains the concepts and basic materials, presents examples and exercises. Exercises are also performed to consolidate the course. Support materials are provided through the virtual campus ATENEA.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.
LEARNING OBJECTIVES OF THE SUBJECT

CE01 - Apply scientific concepts to environmental problems and their correlation with technological concepts.
CE08-Dimension unconventional systems and advanced treatment and raise their mass balance and energy.

Explore scientific concepts and technical principles of quality management of the receiving means, atmosphere, water and soil, and applied to problem solving.
Explore scientific concepts and technical principles of management and treatment of gaseous emissions, water supply, sewage and waste and remediation techniques for groundwater and contaminated soils.
Sized systems for the treatment of major pollutants vectors in specific sectors of activity.
Interprets rules, identifies goals, assesses technical alternatives proposed unconventional solutions and priority actions.

Treatment systems to reduce the emission of grit and dust: Types of treatments. Treatments for dry process. Wet treatments.
Treatment systems to reduce greenhouse gas emissions: absorption. Condensation.
Catalytic and non-catalytic combustion.
Classification of radioactive waste. Waste management of low and intermediate level. Application example.

Acquire scientific knowledge of concepts and technical principles of quality management of media receivers, air, water and soil, and apply it to problem solving. Acquire scientific knowledge about concepts and principles of technical systems management and treatment of exhaust gases, water and waste. Build up of remediation systems. Interpretation of standards, goal identification, evaluation of technical alternatives, unconventional solutions and priority actions.


STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Hours small group</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.80</td>
</tr>
<tr>
<td>Hours large group</td>
<td>19,5</td>
<td>15.59</td>
</tr>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>63.95</td>
</tr>
</tbody>
</table>

**Total learning time:** 125.1 h
## CONTENTS

### Current energy system and environmental impact

**Description:**

**Specific objectives:**
Knowing the different energy sources, energy carriers and devices interconversion of energy; understand the impact of the acquisition and use of energy to the environment; become familiar with the techniques of capture and use of CO2. Learn the different physical and chemical methods of using CO2.

**Full-or-part-time:** 24h
Theory classes: 8h
Practical classes: 2h
Self study: 14h

### New technologies

**Description:**

**Specific objectives:**
Become familiar with catalysis and its importance in processes related to the transformation of energy; understand the principles and methods of the "green engineering".
Evaluate different routes for the conversion of biomass and biofuels; adopt criteria to different interconversion pathways of energy and use of energy carriers.

**Full-or-part-time:** 60h
Theory classes: 20h
Practical classes: 5h
Self study: 35h

### Evaluation

**Full-or-part-time:** 9h 36m
Laboratory classes: 4h
Self study: 5h 36m

## GRADING SYSTEM

The mark of the course is obtained from a course project (40%) and a final exam (60%).

## EXAMINATION RULES.

Both the course project and the exam are required.
BIBLIOGRAPHY

Basic:

Complementary: